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FIELD CROP ENTERPRISE BUDGETS

1987 PROJECTIONS AND GROWER WORKSHEETS

New York State

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Field Crop Enterprise Budgets
1987 Projections and Grower Worksheets

Darwin P. Snyder and William F. Lazarus*

Introduction

The profitability of a farm business is determined by many production and management factors. Perhaps the most elusive of these factors is business management. In order to better manage and improve the profitability of a business, a manager must use many tools to assist in planning, organizing and controlling its operations. One tool that can assist in determining business strengths and weaknesses and in planning the organization and operation of the business is enterprise analysis.

Enterprise analysis involves examining the parts which comprise the business and the interactions between them. With a farm, the parts of the business are the various crop and livestock enterprises. Enterprise analysis involves viewing each crop and livestock activity as a separate unit with their respective receipts and expenses including labor requirements and fixed costs. Thus, rather than scrutinizing only the total farm business, the emphasis is placed on examining forage, grain, livestock and cash crop enterprises and the interactions between them. By examining receipts and all expenses for each enterprise, the strengths and weaknesses of the business can be brought into sharper focus.

Because no two farms have identical resources available, the most profitable combination of enterprises will be unique to each farm. The impact on the business of changes such as adding or deleting an enterprise, increasing rates of production, or altering the size of an enterprise is determined specifically for that farm through enterprise analysis.

The objective of this publication is to provide a data base to assist New York farmers in analyzing field crop enterprises. Enterprise budgets for selected New York field crops are presented and discussed. These budgets are useful for cash crop and livestock farms in New York as well as other states, particularly in the Northeast. Because resources and cost structures in many areas of the Northeast are similar to New York, a budget constructed for other areas of the Northeast would be very similar to the budgets in this publication.

Purpose

The purpose of this publication is to construct 1987 budgets for field crop enterprises typically found on dairy and cash crop farms in

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New York State. These are partial budgets which include only the operating costs for each crop and the returns that might be expected from current prices for somewhat better than average yields.

The results of these budgets will help the user to assess current relative economic advantages of the crops considered. With this information, researchers and farm managers will have a base of information that will help them to advise and make better informed decisions about profitable combinations of crop enterprises. The results can be used as presented or as adapted to meet the conditions of a specific farm business in the budgeting process.

The Budget Procedure

The crop enterprise budgets in this publication are constructed using the economic-engineering approach. This procedure uses current prices for operating costs such as seed, fertilizer, chemicals and supplies. Other variable costs such as machinery repairs and fuel are calculated using engineering data for the operation of the machinery complements assumed for the farm operation.

Although all costs of production need to be considered to determine enterprise profits, these budgets are designed to aid in making short run, annual decisions about enterprise size and mix. With relatively stable fixed costs to spread over the crop acreage, the variable costs, considered here, will provide an estimate of the annual operating costs for each crop. These costs and assumed crop values are used to estimate the net contribution each crop will make toward meeting the fixed costs and other obligations of the farm operator.

The budgets are developed within the context of either a dairy farm or a crop farm. Dairy farms of various sizes are common throughout New York State. The Central and Western New York counties are the most likely locations for crop farms and the larger dairy farms. Budget results should be interpreted and applied in the light of the assumptions made. They can be used for specific farm situations if differences related to enterprise size and yield, and machinery complements are recognized.

Crops common to a dairy farm are budgeted for a 500 acre, 200 cow dairy farm. The crop mix includes 250 acres of hay crops harvested as 100 acres of dry hay and 150 acres of hay crop silage. Two hundred fifty acres of corn are harvested as 150 acres of corn silage and 100 acres of high moisture ear corn. Horizontal silos are used to store silage and a tower silo is used for the high moisture corn.

A 1,200 acre cash crop farm is used as the framework to develop budgets for various field crops common to New York State. Two approaches are budgeted - without and with participation in the 1987 ASCS feed grain program. The basic crop mix for this farm includes 100 acres of dry hay, 750 acres of corn grain, 200 acres of a row crop and 150 acres of a small grain crop.

Each of these two types of farms has a field machinery complement typical of what might be expected to grow and harvest the crops grown on

that farm. Tractors and equipment used directly for livestock care are not included in the machinery complement. Engineering data for each piece of machinery are used to calculate operating and ownership costs for use in the budgets.

The budgets are developed for a given yield level and enterprise size for each crop enterprise. Annual operating costs are included to grow and harvest the crop. Harvest costs for the feed crops on the dairy farm include costs associated with placing the crop in farm storage. Harvest costs for the cash crop enterprises include costs necessary to prepare the crop for sale at the farm gate at harvest time. Costs to store the crops are not included for either farm.

Returns for each crop are based on estimates of values at harvest time and somewhat better than average yields. Cultural practices and input costs are reflective of good yield expectations. Hay crop yields on the dairy farm were assumed to average three tons of dry hay whether harvested dry or as silage. Yield for the acre equivalents of hay crop silage was expressed in terms of hay equivalent to relate production to the value of more readily marketable hay. High moisture corn yields are consistent with the nitrogen input level for corn grain and the tendency for dairymen to harvest the more mature corn as grain rather than silage. Yields for the crop farms are also reflective of the input levels used and good cultural practices.

The budgeting procedure has involved the use of a computer spreadsheet program in the form of templates developed primarily to calculate operating costs for tractors and equipment used to produce the crops. Machinery related assumptions such as price, life, amount of annual use and other factors will have an effect on operating costs charged to the crops. The assumptions used in the templates are believed to be reasonably indicative of the experience of New York crop producers and are presented in the Appendix of this publication.

Sources of Data

Many sources of data have been used in the construction of the budgets. Cultural practices and input levels were assumed with reference to 1987 Cornell Recommends for Field Crops. These practices were adapted to the budgets with the help of members of the Department of Agronomy at Cornell. Several commercial sources provided current prices on crop inputs and farm machinery. Engineering formulas and data used to calculate machinery costs were obtained from agricultural engineering sources. Contact with farm operators enhanced the judgment of the authors in compiling reasonable machinery complements and enterprise combinations.

Suggestions for Use

The field crop budgets presented in this publication have several applications. One obvious use is to provide an estimate of current operating costs for a variety of field crops commonly grown in the State. The results can be used to determine relative direct costs to grow and harvest the budgeted crops. For the crop farm, results of not

participating in the 1987 feed grain program can be compared with participation on the same farm.

The budgets can also be used to plan annual crop acreage combinations. As a starting point, they can be adapted to an individual set of practices and prices to provide estimates of cash flow needs and potential profits for a new year.

Finally, the budgeting process can help explore implications for major changes in enterprise size. Most variable costs included in the budgets will not change significantly with changes in enterprise size. However, as changes in enterprise size or practices dictate changes in equipment size and mix, operating costs per acre for repairs and fuel are likely to change to some degree.

Care must be exercised in using the enterprise budgets for they are only one estimate of costs and returns. They are not designed to represent average New York State conditions; instead they represent a specific set of conditions specified in the footnotes and accompanying tables. It is difficult for a user to compare his situation with an "average" so that he can make necessary adjustments. With a specified set of conditions, the user has a basis for comparison. The user should compare his conditions with those assumed in the budgets. Whenever the farm situation differs significantly from the assumed conditions, the budgeted values must be critically analyzed and often changed. A budget worksheet is provided later in this publication for application of these procedures to a specific farm situation.

Product Prices and Input Costs

The prices and costs used in the budgets are shown in Table 1. The product prices are believed to be reasonable expectations for the 1987 crop year in New York State. Feed grain prices are estimated local support prices. Deficiency payments for corn and wheat are shown since one budget estimates the effect of program participation for these crops. The user should include the effects of participation on enterprise costs and returns and on the whole farm business as he makes decisions about his cropping program.

Input costs are representative of what producers can expect to pay for seed, fertilizer, chemicals, supplies and other costs in 1987.

Budget Format

Because these budgets are intended to aid in making short-run management decisions, the format includes provision for only variable costs for each crop. Budgets are presented for the dairy farm and several situations on the crop farm.

The dairy farm (Tables 2 and 3) and cash crop farm include the crop enterprise mixes described earlier. Two crop farm situations are budgeted for different corn planting methods. Crop Farm #1 (the base farm) is budgeted for corn grain grown using conventional tillage practices (Tables 4 and 5). Crop Farm #2 has the same crop mix and acreages

Table 1. Product Prices and Input Costs

PRICES							
Product			Unit		Price		
Hay-alfalfa and grass			ton		\$70.00		
Corn silage			ton		21.00		
Corn grain			bu		2.00		
Corn deficiency payment			bu		1.21		
HM ear corn (33% mc.)			ton		45.00		
Wheat			bu		2.50		
Wheat deficiency payment			bu		2.10		
Oats			bu		1.50		
Straw			ton		50.00		
Soybeans			bu		4.50		
Red kidney beans			lb		0.20		
COSTS							
Item		Unit	Cost	Item		Unit	Cost
<u>Seed</u>				<u>Chemicals</u> ^a			
Alfalfa	lb		\$2.76	2,4-D	gl		\$10.05
Timothy	lb		0.99	2,4-DB	gl		15.62
Corn	unit		66.00	Atrazine 4L	gl		8.37
Wheat, winter	bu		6.91	Benlate 50WP	lb		13.63
Oats	bu		4.40	Dual 8E	gl		49.51
Soybeans	bu		13.00	Eptam 7E	gl		23.46
Red kidney beans	lb		0.60	Furadan 15G	lb		1.48
				Lasso	gl		20.94
<u>Fertilizer</u>				Lorox L	gl		57.45
N	lb		0.18	Paraquat	gl		48.54
P	lb		0.19	Thimet 20G	lb		1.34
K	lb		0.11	Treflan	gl		29.61
				Malathion 5E	gl		18.12
<u>Lime, spread</u>			ton	23.75	Methoxychlor 2E	gl	13.34
					Seed treatment	ac	0.58
<u>Labor</u>				<u>Other</u>			
Regular	hr		7.15	Twine (9,000 ft.)	bale		18.50
Hourly, seasonal	hr		5.10	Diesel-field	gl		0.75
				Diesel-road	gl		0.98
Capital	%		10.2	Gasoline-field, R	gl		0.80
				Gasoline-road, UL	gl		0.95
				LP Gas-propane	gl		0.75

^aTrade names are used as examples and do not imply endorsement.

but the budgets are adapted for corn grain grown using no-till related practices, machinery and inputs (Tables 8 and 9). Other management practices are assumed to be the same for both crop farms.

Budgets for other situations are presented for Crop Farm #1. Budgets are presented for red kidney beans and oats substituted for soybeans with no equipment or acreage changes (Tables 4 and 5). Also, enterprise budgets are presented for the base crops on Crop Farm #1 assuming participation in the corn and wheat feed grain programs with acreages at or slightly less than the maximum permitted acreages for each crop (Tables 6 and 7).

Variable costs are divided into four categories: cash costs for growing and harvesting the crop, interest on these operating costs and labor costs. Labor is included as a variable cost because of the varying requirements for the different crops.

The first table for each farm situation (Tables 2, 4, 6 and 8) provide some detail for the various categories as well as the total of these variable costs. Numbers in parentheses indicate physical quantities of those inputs.

The second table for each situation (Tables 3, 5, 7 and 9) compares the variable costs and returns for each crop. The tables also illustrate the effects of crop price or yield changes on returns per unit for each enterprise.

In analyzing the short-run income and profitability of each crop, the net returns per acre or unit over variable costs provides a basis for comparison. This factor shows how much each crop acre or unit contributes to fixed or overhead costs for each enterprise. Fixed costs include the ownership costs (depreciation, interest, taxes, insurance, and housing) or the machinery complement and land costs. The factor does not include a contribution toward the costs of marketing the crop since the assumption has been made that the crop is priced at harvest.

An analysis that included the marketing activity would involve assumptions related to the average crop price received during the marketing period and the costs associated with the marketing effort. These costs would include storage, interest on the stored crop, processing, packaging, transportation and any other items that had an effect on the price received for the crop. Marketing practices vary widely between farms and are best analyzed apart from production practices and on a farm specific basis.

Tables 2 through 9 show budgeted variable costs for typical crops in the various farm situations. The next two tables (Tables 10 and 11) provide comparisons of total costs and returns for the farms in each situation. These tables include the fixed costs for machine ownership and a charge for the use of the land. Land is charged at the current

average rental rate paid for cropland by New York farmers.¹ At \$30 per acre, actual costs of ownership are understated. However, a common rental rate applied consistently to each enterprise and farm situation prevents differences in taxes and land values from affecting enterprise result comparisons.

Tables 10 and 11 show the total value of all crops grown in each combination of field crop enterprises. It should be noted that these values represent harvest time values and the budget costs do not include storing or marketing costs. To be successful, marketing efforts should result in crop prices enough higher than harvest time values to more than offset storing and marketing costs.

Total variable costs for the farm situations shown in the tables will provide some indication of the cash flow needs to grow and harvest the crops. These needs can be compared for the various crop enterprise combinations shown.

Budget Results

Total variable costs per acre for the field crops grown on the dairy farm were quite similar. With the yields and crop values assumed for these budgets, net returns per acre over variable costs, except for corn silage, were also quite similar. Corn silage, valued at 30 percent of the price of hay as harvested, had a considerably higher net return per acre.

Comparisons of the various crop enterprises on the crop farms indicate notable differences in enterprise net returns over variable costs. Since the crop acre is the unit of production, the net return per acre is valid for enterprise comparisons. Table 5 illustrates the advantage, in 1987, of both red kidney beans and oats over soybeans under the assumptions used. Both crops are projected to contribute about \$45 to \$50 per acre more than soybeans toward the fixed costs and other financial needs of the farm business.

In Tables 6 and 7, the effects of participation in the corn and wheat feed grain programs are compared with the effects of non-participation. Enterprise size for both situations is held constant; that is, set-aside acres are included with producing acres. By including set-aside acres, costs and returns per acre for the participating enterprise are proportionately less than for the non-participating enterprise. The combination of lower costs and government payments for participating in the feed grain programs results in higher net returns and illustrates the advantage participating growers have over non-participating growers for each enterprise.

The results of conventional tillage and no-till practices for corn can be compared from Tables 4 and 5 and Tables 8 and 9. No-till corn

¹ D. P. Snyder, Real Estate Rental Rates, New York State, 1984, A.E. Ext. 85-21, Department of Agricultural Economics, Cornell University, Ithaca, NY, 14853-7801.

production practices are assumed to involve higher total variable costs and expected lower average yields than conventional practices. Lower growing costs for labor and machinery fuel and repair costs are more than offset by higher nitrogen, lime and chemical costs per acre. Net returns over variable costs are over \$25 per acre higher for conventionally tilled corn.

Differences in net returns per acre for individual enterprises are reflected in the results for the overall farm businesses of which the enterprises are a part. Tables 10 and 11 indicate levels of net returns over variable costs for each farm situation for the crop costs detailed in previous tables. This factor provides an indication of the amount available from the current year's crop proceeds to meet fixed costs, debt service, capital purchases and management expectations of the farm operator. The farm operator's labor cost is included with other labor.

Net returns over total costs for each farm situation in the tables provides a comparison of returns to management and profit for the operator of the farm business. The dairy farm has income from livestock, not shown in the tables, in addition to the value of crops fed on the farm. Therefore, it is not easily compared with the cash crop farm situations. Table 10 indicates a positive contribution to farm profit from the crop enterprises on the dairy farm using the assumed crop values, yields and costs.

Overall farm results for the crop farm vary widely for the various situations budgeted. Results shown in Table 10 indicate conventional corn has an advantage over no-till corn even though net returns over total costs are negative in both cases. Likewise, a significant advantage is shown for the crop farm situation involving participation in the feed grain programs compared to the other non-participating crop farm situations. Table 11 indicates the non-participating crop farm can be expected to have higher net returns with an oat enterprise than with red kidney beans. Either of these enterprises should produce better results than if soybeans are grown in 1987.

Reference is made to Appendix Tables 1 through 4 which show data for the crop machinery complements used for the dairy farm and each of the two crop farm budgets.

Notes to the following Tables 2, 4, 6 and 8:

- a. Seed - Cost for hay crops represents the annual cost for 12 pounds of alfalfa and five pounds of timothy allocated over a four year life of the stand.
 Corn seed: 24-26 thousand kernels per acre.
- b. Fertilizer - hay crops - Includes 25 percent of fertilizer required for seeding.
 Corn silage - Nitrogen reduced because of manure application.
- c. Lime - Application should be based on soil test results. One-half ton of lime per acre is assumed for annual pH maintenance except for a somewhat higher requirement for no-till corn to maintain pH in the seed zone.
- d. Chemicals - materials and rates per acre.
 Hay crops - 2,4-DB (0.5 qt) for seeding. Methoxychlor 2E (0.75 gal) Malathion 5E (0.3 gal) applied annually to 15 percent of the acreage.
 Corn - Conventional tillage - Dual 8E (2 pt), and Atrazine 4L (1 qt) per acre; seed treatment; Furadan 15G (6.7 lb/ac on 1/2 acreage).
 Corn - no till - Paraquat (1 qt), Lasso (2.5 qt), Atrazine 4L (1.5 qt); seed treatment; Furadan 15G (6.7 lb/ac on 1/2 acreage).
 Soybeans - Dual 8E (2 pt), Lorox L (1 qt); seed treatment
 Red Kidney Beans - Eptam 7EC (2 pt), Treflan 4E (1 pt); seed treatment, Sevin 80S (1.25 lb)
 Winter Wheat and Oats - 2,4-D (0.75 pt).
- e. Interest - Calculated on growing and harvesting expenses at 10.2 percent for the crop production period.
- f. Labor - Hours based on 1.3 times machinery hours. Additional hours added for handling hay and straw.
- g. Drying Corn - assume removal of 10 percentage points of moisture at three cents per point or 30 cents per bushel for all drying related costs.

Notes to Tables 6 and 7:

- a. Costs and returns for participating corn and wheat enterprises are averaged over the total enterprise acreage including set-aside acreage.
- b. Other returns per acre:
 Corn = 90 bu/ac ASCS yield x \$1.21/bu deficiency payment x 80% of base acres = \$87.12/ac.
 Wheat = ((45 bu/ac ASCS yield x \$2.10 bu deficiency payment) + \$50/ac straw) x 72% of base acres = \$104.04/ac.

Table 2.

Field Crop Enterprise Budgets
Variable Costs
500 Acre, 200 Cow Dairy Farm - 1987 Projected

Crop	Hay	Hay Crop Silage	Corn Silage	High Moist. Ear Corn
Acres	100	150	150	100
Yield Per Acre	3.0 tons	3.0 tons (HE)	17 tons	5.3 tons
Variable Costs	\$	\$	\$	\$
<u>Growing</u>				
Seed	9.52	9.52	21.78	19.80
Fert. -N (lb)	(7)	(7)	(26M K)	(24M K)
P (lb)	(35)	(35)	(40)	(125)
K (lb)	(57)	(57)	(40)	(40)
Lime (tn)	(0.5)	(0.5)	(40)	(40)
Chemicals	11.88	11.88	(0.5)	4.40
Power/Equipment	4.34	4.34	11.88	11.88
- fuel, oil			20.01	20.01
- repair, maint.	1.60	1.60	5.13	5.13
Other	1.62	1.62	6.00	6.00
	<u>2.00</u>	<u>2.00</u>	<u>2.00</u>	<u>2.00</u>
Total Growing	58.19	58.19	85.99	99.31
<u>Harvesting</u>				
Power/Equipment				
- fuel, oil	7.55	10.49	6.98	6.01
- repair, maint.	11.30	17.61	10.82	9.68
Twine	6.00	0.00	0.00	0.00
Other	<u>3.00</u>	<u>3.00</u>	<u>5.00</u>	<u>5.00</u>
Total Harvesting	27.85	31.10	22.79	20.69
Interest - operating	<u>4.39</u>	<u>4.55</u>	<u>3.70</u>	<u>4.08</u>
Total Selected Variable Costs	90.43	93.84	112.48	124.08
Labor (hours)	(5.7)	(4.2)	(4.1)	(3.2)
	<u>37.41</u>	<u>30.16</u>	<u>29.05</u>	<u>22.53</u>
Total Variable Costs	127.84	124.01	141.53	146.61

See notes on page 9.

Table 3.
Field Crop Enterprise Budgets
Comparison of Returns Over Variable Costs
Dairy Farm - 1987 Projected

Crop	Hay	Hay Crop Silage	Corn Silage	High Mois. Ear Corn
Acres	100	150	150	100
Yield Per Acre	3.0 tons	3.0 tons (HE)	17 tons	5.3 tons
Price Per Unit	\$70.00	\$70.00	\$21.00	\$45.00
	\$	\$	\$	\$
<u>Returns per acre</u>				
Crop	210.00	210.00	357.00	238.50
Other	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>
Total returns	210.00	210.00	357.00	238.50
Total variable costs per acre	127.84	124.01	141.53	146.61
Net returns over variable costs:				
- per acre	82.16	85.99	215.47	91.89
- per unit produced	27.39	28.66	12.67	17.34
Break-even price per unit of primary product to cover variable costs	42.61	41.34	8.33	27.66

<u>SENSITIVITY TO CROP PRICE OR YIELD CHANGES:</u>				
<u>20% Lower Crop Price or Yield</u>				
Total returns per acre	168.00	168.00	285.60	190.80
Net returns over variable costs:				
- per acre	40.16	43.99	144.07	44.19
- per unit produced	13.39	14.66	8.47	8.34
<u>20% Higher Crop Price or Yield</u>				
Total returns per acre	252.00	252.00	428.40	286.20
Net returns over variable costs:				
- per acre	124.16	127.99	286.87	139.59
- per unit produced	41.39	42.66	16.87	26.34

Table 4.

Field Crop Enterprise Budgets
Variable Costs
1,200 Acre Crop Farm #1 - 1987 Projected
(No participation in government programs)

Crop	Hay	Corn Grain (conv.-till)	Soybeans (drilled)	Winter Wheat	Substituted For Soybeans RK Beans	Oats
Acres	100	750	200	150	200	200
Yield Per Acre	3 tons	120 bu.	30 bu.	60 bu.	1,200 lb.	80 bu.
Variable Costs	\$	\$	\$	\$	\$	\$
<u>Growing</u>						
Seed	9.52	(24M K) 19.80	(1 bu) 13.00	(2 bu) 13.82	(84 lb) 50.40	(2.5 bu) 11.00
Fert. - N (1b)	(7) 1.26	(125) 22.50	(10) 1.80	(50) 9.00	(25) 4.50	(50) 9.00
P (1b)	(35) 6.65	(40) 7.60	(20) 3.80	(40) 7.60	(62) 11.78	(30) 5.70
K (1b)	(57) 6.27	(40) 4.40	(20) 2.20	(20) 2.20	(43) 4.73	(20) 2.20
Lime (tn)	(0.5) 11.88	(0.5) 11.88	(0.5) 11.88	(0.5) 11.88	(0.5) 11.88	(0.5) 11.88
Chemicals	4.34	20.01	27.32	0.95	29.86	0.95
Power/Equipment						
- fuel, oil	1.41	4.10	4.34	4.34	4.34	4.34
- repair, maint.	1.72	6.42	5.54	5.54	5.54	5.55
Other	2.00	2.00	3.00	1.00	3.00	2.00
Total Growing	45.03	98.71	72.88	56.32	126.02	52.62
<u>Harvesting</u>						
Power/Equipment						
- fuel, oil	8.47	3.74	2.56	4.19	2.56	4.27
- repair, maint.	11.61	11.31	10.01	9.00	10.01	9.47
Drying	0.00	36.00	0.00	0.00	0.00	0.00
Twine	6.00	0.00	0.00	2.00	0.00	2.00
Other	3.00	5.00	5.00	3.00	5.00	3.00
Total Harvesting	29.09	56.05	17.57	18.18	17.57	18.74
Interest - operating	3.78	5.26	3.08	5.70	4.89	2.43
Total Selected Variable Costs	77.90	160.02	93.53	80.20	148.48	73.79
Labor (hours)	(6.3) 41.69	(2.5) 17.98	(2.3) 16.52	(3.9) 26.66	(2.3) 16.52	(3.4) 24.39
Total Variable Costs	119.59	178.00	110.05	106.86	165.00	98.18

See notes on page 9.

Table 5.
Field Crop Enterprise Budgets
Comparison of Returns Over Variable Costs
1,200 Acre Crop Farm #1 - 1987 Projected
(No participation in government programs)

Crop	Hay	Corn Grain (conv. till)	Soybeans (drilled)	Winter Wheat	Substituted For Soybeans	
					RK Beans	Oats
Acres	100	750	200	150	200	150
Yield Per Acre	3 tons	120 bu.	30 bu.	60 bu.	1,200 lb.	80 bu.
Price Per Unit	\$70.00	\$2.00	\$4.50	\$2.50	\$0.20	\$1.50
	\$	\$	\$	\$	\$	\$
Returns per acre						
Crop	210.00	240.00	135.00	150.00	240.00	120.00
Other	0.00	0.00	0.00	50.00	0.00	50.00
Total returns	210.00	240.00	135.00	200.00	240.00	170.00
Total variable costs	119.59	178.00	110.05	106.86	165.00	98.18
Net returns over variable costs:						
- per acre	90.41	62.00	24.95	93.14	75.00	71.82
- per unit produced	30.14	0.52	0.83	1.55	0.06	0.90
Break-even price per unit of primary product to cover variable costs	39.86	1.48	3.67	0.95	0.14	0.60

SENSITIVITY TO CROP PRICE OR YIELD CHANGES:						
20% Lower Crop Price or Yield:						
Total returns per acre	168.00	192.00	108.00	160.00 ^a	192.00	136.00 ^a
Net returns over variable costs:						
- per acre	48.41	14.00	(2.05)	53.14	27.00	37.82
- per unit produced	16.14	0.12	(0.07)	0.89	0.02	0.47
20% Higher Crop Price or Yield:						
Total returns per acre	252.00	288.00	162.00	240.00 ^a	288.00	204.00 ^a
Net returns over variable costs:						
- per acre	132.41	110.00	51.95	133.14	123.00	105.82
- per unit produced	44.14	0.92	1.73	2.22	0.10	1.32

^aIncludes straw at adjusted price and yield.

Table 6.

Field Crop Enterprise Budgets
Variable Costs
1,200 Acre Crop Farm #1 - 1987 Projected
(Government program participation and non-participation compared)

Crop	Hay	Corn Grain - Conv. Till		Soybeans (drilled)	Winter Wheat	
		Non-part. ^a	Participate ^b		Non-part. ^a	Participate ^b
Acres planted/set-aside	100	750	600/150	200	150	108/42
Yield Per Acre	3 tons	120 bu.	96 bu.	30 bu.	60 bu.	43 bu.
Variable Costs	\$	\$	\$	\$	\$	\$
<u>Growing</u>						
Seed						
Fert. -N (lb)	9.52	(24M K)	19.80	(1 bu)	13.00	(2 bu)
P (lb)	1.26	(125)	22.50	(10)	1.80	50
K (lb)	6.65	(40)	7.60	(20)	3.80	(40)
Lime (tn)	6.27	(40)	4.40	(20)	2.20	(20)
Chemicals	11.88	(0.5)	11.88	(0.5)	11.88	(0.4)
Power/Equipment	4.34		20.01		27.32	
- fuel, oil	1.41		4.10		4.34	
- repair, maint.	1.64		6.42		5.24	
Other	2.00		2.00		3.00	
Total Growing	44.95		98.71		72.58	
<u>Harvesting</u>						
Power/Equipment						
- fuel, oil	8.47		3.74		2.57	
- repair, maint.	11.80		11.31		9.41	
Drying	0.00		36.00		0.00	
Twine	6.00		0.00		0.00	
Other	3.00		5.00		5.00	
Total Harvesting	29.28		56.05		16.98	
Interest - operating	3.79		5.26		3.05	
Total Selected						
Variable Costs	78.02		160.02		80.20	
Labor (hours)	(6.3)	(2.5)	17.98	(2.3)	16.55	(3.9)
Total Var. Costs	119.70		143.16		109.16	
					106.86	
						76.84

See notes on page 9.

^aFrom Table 4.

^bVariable costs per acre under the "participate" alternative are reduced to reflect the proportion of acres actually planted, i.e., for corn, 600 acres planted is 80 percent of the total 750 acres in the enterprise, so costs are reduced to 80 percent of the "non-participate" costs.

Table 7.
Field Crop Enterprise Budgets
Comparison of Returns Over Variable Costs
1,200 Acre Crop Farm #1 - 1987 Projected
(Government program participation and non-participation compared)

Crop	Hay	Corn Grain - conv. till		Soybeans (drilled)	Winter Wheat	
		Non-Part. ^a	Participate		Non-part. ^a	Participate
		750	600/150	200	150	108/42
Acres planted/set-aside	100			30 bu.	60 bu.	43 bu.
Yield Per Acre	3 tons	120 bu.	96 bu.	\$4.50	\$2.50	\$2.50
Price Per Unit	\$70.00	\$2.00	\$2.00			
	\$	\$	\$	\$	\$	\$
Returns per acre						
Crop	210.00	240.00	192.00	135.00	150.00	107.50
Other	0.00	0.00	87.12	0.00	50.00	104.04
Total returns	210.00	240.00	279.12	135.00	200.00	211.54
Total variable costs	119.70	178.00	143.16	109.16	106.86	76.84
per acre						
Net returns over variable costs:						
- per acre	90.30	62.00	135.96	25.84	93.14	134.70
- per unit produced	30.10	0.52	1.42	0.86	1.55	3.13
Break-even price per unit						
of primary product to						
cover variable costs	39.90	1.48	0.58	3.64	0.95	(0.63)

SENSITIVITY TO CROP PRICE OR YIELD CHANGES:						
20% Lower Crop Price or Yield:	168.00	192.00	240.72	108.00	160.00 ^b	204.34 ^b
Total returns per acre						
Net returns over variable costs:						
- per acre	48.30	14.00	104.76 ^c	(1.16)	53.14	127.50
- per unit produced	16.10	0.12	1.09	(0.04)	0.89	2.97
20% Higher Crop Price or Yield:	252.00	288.00	317.52	162.00	240.00 ^b	240.24 ^b
Total returns per acre						
Net returns over variable costs:						
- per acre	132.30	110.00	167.16 ^c	52.84	133.14	163.40
- per unit produced	44.10	0.92	1.74	1.76	2.22	3.80

See notes on page 9.

^aFrom Table 5.

^bIncludes straw at adjusted price and yield.

^cYield changes affect corn drying costs.

Table 8.

Field Crop Enterprise Budgets
Variable Costs
1,200 Acre Crop Farm #2 - 1987 Projected
(No participation in government programs)

Crop	Hay	Corn Grain (no-till)	Soybeans (drilled)	Winter Wheat
Acres	100	750	200	150
Yield Per Acre	3 tons	110 bu.	30 bu.	60 bu.
<u>Variable Costs</u>	\$	\$	\$	\$
<u>Growing</u>				
Seed				
Fert. -N (1b)	(7)	(24M K)	(1 bu)	(2 bu)
P (1b)	(35)	(145)	(10)	(50)
K (1b)	(57)	(40)	(20)	(40)
Lime (tn)	(0.5)	(40)	(20)	(20)
Chemicals	11.88	(0.75)	(0.5)	(0.5)
Power/Equipment	4.34	17.81	11.88	11.88
- fuel, oil		32.87	27.32	0.95
- repair, maint.	1.58	1.21	4.68	4.68
Other	1.61	2.94	5.02	5.02
	<u>2.00</u>	<u>2.00</u>	<u>3.00</u>	<u>1.00</u>
Total Growing	45.09	114.73	72.69	56.14
<u>Harvesting</u>				
Power/Equipment				
- fuel, oil	8.47	3.73	2.58	4.22
- repair, maint.	11.78	11.31	10.04	9.07
Drying	0.00	33.00	0.00	0.00
Twine	6.00	0.00	0.00	2.00
Other	<u>3.00</u>	<u>5.00</u>	<u>5.00</u>	<u>3.00</u>
Total Harvesting	29.26	53.04	17.62	18.29
Interest - operating	<u>3.79</u>	<u>5.71</u>	<u>3.07</u>	<u>5.69</u>
Total Selected Variable Costs	78.14	173.48	93.38	80.12
Labor (hours)	(6.3)	(1.7)	(2.2)	(4.0)
Total Variable Costs	<u>41.69</u>	<u>12.01</u>	<u>16.03</u>	<u>26.21</u>
	119.83	185.48	109.41	106.33

See notes on page 9.

Table 9.

Field Crop Enterprise Budgets
Comparison of Returns Over Variable Costs
1,200 Acre Crop Farm #2 - 1987 Projected
(No participation in government programs)

Crop	Hay	Corn Grain (no-till)	Soybeans (drilled)	Winter Wheat
Acres	100	750	200	150
Yield Per Acre	3 tons	110 bu.	30 bu.	60 bu.
Price Per Unit	\$70.00	\$2.00	\$4.50	\$2.50
	\$	\$	\$	\$
Returns per acre				
Crop	210.00	220.00	135.00	150.00
Other	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>	<u>50.00</u>
Total returns	210.00	220.00	135.00	200.00
Total variable costs				
per acre	119.83	185.48	109.41	106.33
Net returns over variable costs				
- per acre	90.17	34.52	25.59	93.67
- per unit produced	30.06	0.31	0.85	1.56
Break-even price per unit of primary product to cover variable costs	39.94	1.69	3.65	0.94

<u>SENSITIVITY TO CROP PRICE OR YIELD CHANGES:</u>				
<u>20% Lower Crop Price or Yield</u>				
Total returns per acre	168.00	176.00	108.00	160.00 ^a
Net returns over variable costs				
- per acre	48.17	(9.48)	(1.41)	53.67
- per unit produced	16.06	(0.09)	(0.05)	0.89
<u>20% Higher Crop Price or Yield</u>				
Total returns per acre	252.00	264.00	162.00	240.00 ^a
Net returns over variable costs				
- per acre	132.17	78.52	52.59	133.67
- per unit produced	44.06	0.71	1.75	2.23

^aIncludes straw at adjusted price and yield.

Table 10.

Field Crop Enterprise Budgets
Comparison of Farm Total Costs and Returns
1987 Projected

Item	500 Acre Dairy Farm	1200 Acre Crop Farm		
		#1 Conventional Corn Without Partici- pation	With Partici- pation	#2 No-till Corn Without Partici- pation
	\$	\$	\$	\$
Total Crop Returns ^a	129,900	258,000	289,146	243,000
<u>Variable Costs</u>				
Growing:				
Seed	7,626	20,475	16,924	20,910
Fertilizer, lime	15,813	45,923	37,678	53,076
Chemicals, other	7,084	23,495	20,112	32,705
Machinery - fuel, repairs	<u>3,586</u>	<u>11,669</u>	<u>9,387</u>	<u>6,827</u>
Total Growing	34,109	101,561	84,101	113,518
Total Harvesting	13,015	51,187	41,971	48,974
Interest - operating	1,922	5,794	4,746	6,126
Labor	<u>14,991</u>	<u>24,958</u>	<u>21,882</u>	<u>20,313</u>
Total Variable Costs	64,037	183,500	152,700	188,930
<u>Fixed Costs</u>				
Machine ownership	33,201	54,118	54,154	48,006
Land	<u>15,000</u>	<u>36,000</u>	<u>36,000</u>	<u>36,000</u>
Total Fixed Costs	48,201	90,118	90,154	84,006
Total Crop Costs ^b	112,239	273,618	242,854	272,936
<u>Net Returns Over:</u>				
Variable Costs	65,863	74,500	136,446	54,070
Total Costs	17,661	(15,618)	46,292	(29,936)
(Return to mgmt. & profit)				

^a Value at harvest time at the farm. Returns include straw.
 Crop acres - Dairy Farm - Hay (100), HCS (150), Corn Silage (150),
 HMEC (100).
 Crop Farms - Hay (100), Corn grain (750), Soybeans (200),
 Wheat (150).
 ASCS participating farm diverts 150 acres corn,
 42 acres wheat

^b Includes drying; excludes hauling, storage, marketing and management.

Table 11.

Field Crop Enterprise Budgets
Comparison of Farm Total Costs and Returns
1,200 Acre Crop Farm #1 - 1987 Projected
(No participation in government programs)

Crop (acres) Item	Hay (100), Corn Grain (750), W. Wheat (150) plus - Soybeans (200) <u>or</u> RK Beans (200) <u>or</u> Oats (200)		
	\$	\$	\$
Total Crop Returns ^a	258,000	279,000	265,000
<hr/>			
<u>Variable Costs</u>			
Growing:			
Seed	20,475	27,955	20,075
Fertilizer, lime	45,923	48,565	47,743
Chemicals, other	23,495	24,002	18,020
Machinery - fuel, repairs	<u>11,669</u>	<u>12,069</u>	<u>11,707</u>
Total Growing	101,561	112,591	97,544
Total Harvesting	51,187	51,192	51,259
Interest - operating	5,794	6,168	5,664
Labor	<u>24,958</u>	<u>25,062</u>	<u>26,342</u>
Total Variable Costs	183,500	195,014	180,809
 <u>Fixed Costs</u>			
Machine ownership	54,118	54,118	52,035
Land	<u>36,000</u>	<u>36,000</u>	<u>36,000</u>
Total Fixed Costs	90,118	90,118	88,035
Total Crop Costs ^b	273,618	285,131	268,844
<hr/>			
<u>Net Returns Over:</u>			
Variable Costs	74,500	83,986	84,191
Total Costs (Return to mgmt. & profit)	(15,618)	(6,131)	(3,844)

^aValue at harvest time at the farm. Returns include straw.

^bIncludes drying; excludes hauling, storage, marketing, and management.

Grower Worksheets

The following worksheets are intended to assist the crop producer in making decisions with regard to his combination of enterprises for the coming year. The first worksheet closely follows the format of the budgets developed in Table 2 through Table 9. Completion of the Budget Worksheet for a crop enterprise will enable the grower to compare his estimate with the budgets in this publication.

Following the Budget Worksheet is a series of three worksheets designed to guide the user through a cash flow projection for a proposed crop mix for the whole farm. The format is somewhat different from that used in the budgets. Of necessity, the budgets present reasonable estimates of typical costs per acre for each crop suggested. They are based on stated input prices and levels and machinery complement assumptions. On the other hand, the worksheets enable a grower to enter specific figures based on his own experience and estimates. Thus, the results should be a more accurate estimate of an individual farmer's experience.

Worksheet 1 provides a place to list expected returns and variable costs per acre for each proposed crop. The purpose is to estimate the returns per acre over cash variable costs. One major problem may be in estimating fuel and repair costs for power (tractors and trucks) and equipment used to grow and harvest the crops. Table 12 summarizes these costs for crops used in the budgets. These fuel and repair costs would be reasonable to use in Worksheet 1 in the absence of better farm data.

Worksheet 2 provides a place to list the various cash fixed costs for the whole farm business for the previous year. Once summarized, last year's costs can be adjusted to reflect changes that can be anticipated for this year. For continued farm operation, these cash costs must be met regardless of crop mix decisions.

Finally, Worksheet 3 provides a place to summarize returns over cash variable costs for two different proposed crop mixes. It leads to an estimate of cash available or needed after allowing for variable costs for each crop mix, total farm cash fixed costs including the operator's living costs and scheduled debt service. Excess cash would be available for operating loan interest, capital purchases or savings, etc. Operating loan principal is covered by the cash variable costs included. A lack of excess cash would indicate a need for additional operating cash from increased borrowing, savings, off-farm income or other non-farm sources during the year.

Table 12. Budgeted Fuel and Repair Costs for Machinery
 Needed to Grow and Harvest Selected Crops, 1987

Crop	Cash variable costs per acre	
	Fuel, lubrication	Repairs, maintenance
	\$	\$
Hay	10	13
Hay crop silage	12	20
Corn silage	12	17
High moisture ear corn	11	16
Corn grain - conv. till	8	18
Corn grain - no-till	5	14
Oats	9	15
Wheat	9	15
Soybeans	7	16
Red Kidney Beans	7	17

BUDGET WORKSHEET.

Crop _____

Year _____

Field Crop Enterprise
Variable Costs and Returns per Acre

Item	Quantity	Units	Per Unit	Average Per Acre
	no.		\$	\$
<u>Returns</u>				
Crop _____	_____	_____	_____	_____
Other _____	_____	_____	_____	_____
Total Crop Returns				(1)\$ _____
<u>Variable Costs</u>				
<u>Growing</u>				
Seed _____	_____	_____	_____	_____
Fert. _____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
Lime _____	_____	_____	_____	_____
Chem. _____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
Power/Equipment ^a - Fuel, oil				_____
Repair, maint.				_____
Other _____				_____
Total Growing costs				\$ _____
<u>Harvesting</u>				
Power/Equipment ^a - Fuel, oil				_____
Repair, maint.				_____
Drying _____				_____
Twine _____				_____
Other _____				_____
Total Harvesting Costs				_____
<u>Interest</u> - operating				_____
Total Selected Variable Costs				\$ _____
<u>Labor</u> _____	_____	hours	_____	_____
_____	_____	hours	_____	_____
Total Labor Costs				_____
Total Variable Costs				(2)\$ _____
Net Returns over Variable Costs				(1-2)\$ _____

^aSee Table 12 in text for suggested costs if farm data is not available.

WORKSHEETS

Worksheet 1. Calculation of Returns Over Crop Cash Variable Costs

Worksheet 2. Calculation of Annual Farm Cash Fixed Costs

Worksheet 3. Results of Crop Mix Alternatives

Worksheet 1. CALCULATION OF RETURNS OVER CROP CASH VARIABLE COSTS

Crop Mix. No. _____

(Use crops that are ...)

Crop	_____	_____
Yield per acre expected	_____	_____
Price per unit expected when sold	\$ _____	\$ _____
Crop returns per acre	\$ _____	\$ _____
Other returns per acre	_____	_____
Total returns per acre	(1) \$ _____	\$ _____

Cash Variable Costs^a

- - - - Per acre - - - -

Labor - part-time seasonal	\$ _____	\$ _____
Seed	_____	_____
Fertilizer: _____	_____	_____
_____	_____	_____
_____	_____	_____
Lime	_____	_____
Chemicals: Herbicides	_____	_____
Insecticides	_____	_____
Fungicides	_____	_____
Seed Treatment	_____	_____
Supplies - twine, preservative, etc.	_____	_____
Power & equipment to grow and harvest: ^b	_____	_____
- Fuel and lube	_____	_____
- Repair and maintenance	_____	_____
Machine hire, rent	_____	_____
Hauling	_____	_____
Marketing	_____	_____
Storage	_____	_____
Other cash costs	_____	_____
Total Crop Cash Variable Costs	(2) \$ _____	\$ _____
Returns over Cash Variable Costs	(1)-(2) \$ _____	\$ _____

^aCosts experienced only if the crop is produced.^bSee Table 12 in text for suggested costs if farm data is not available.

Worksheet 1. (continued)

... feasible for your operation - include set-aside acres as a crop.)

\$	\$	\$	\$	\$	\$
\$	\$	\$	\$	\$	\$
\$	\$	\$	\$	\$	\$

..... Per acre

[illegible]

Worksheet 2. CALCULATION OF ANNUAL FARM CASH FIXED COSTS^a

Total crop acres:	Last Year	This Year
Owned	_____	_____
Rented	_____	_____
Total Operated	_____	_____
<hr/>		
<u>Annual Cash Fixed Costs</u>	- - Total cost per farm - -	
Operator family living	\$ _____	\$ _____
Regular hired labor -		
Gross wages	_____	_____
Benefits & employer costs	_____	_____
Taxes - real estate	_____	_____
Rent - cropland, buildings	_____	_____
Insurance - fire, liability	_____	_____
Vehicle taxes & insurance	_____	_____
Utilities - phone, electric, water, etc.	_____	_____
Miscellaneous costs	_____	_____
Total Farm Cash Fixed Costs	\$ _____	\$ _____

^aNote: These annual farm cash fixed costs must be met for continued operation of the business this year. This year's costs are based on last year's costs adjusted to reflect anticipated changes in costs, price levels and, perhaps, crop mixes and acreages. Consideration of these factors is necessary to make reasonable estimates of the cash fixed costs for the farm business for "This Year".

Worksheet 3. RESULTS OF CROP MIX ALTERNATIVES

Year 19__

Crop	Crop Mix 1 Acres	Returns Over Cash Variable Costs		Crop Mix 2 Acres	Returns Over Cash Variable Costs	
		Per Acre	Total		Per Acre	Total
(From Worksheet 1)	(1)	(2)	(1)x(2)	(1)	(2)	(1)x(2)
_____	_____	\$ _____	\$ _____	_____	\$ _____	\$ _____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
Total Farm Return Over Cash Variable Costs			\$ _____			\$ _____
less Total Farm Cash Fixed Costs (From Worksheet 2; this year)			- _____			- _____
less scheduled debt service excluding crop loans ^a for the current year			- _____			- _____
Cash - available for crop loan interest, purchases, savings, etc.			\$ _____			\$ _____
<u>or</u> - (needed) from increased debt or non-farm sources			(\$ _____)			(\$ _____)

^aCrop or operating loan principal is covered by cash variable costs included on Worksheet 1.

Appendix
Table 1.Crop Machinery Investment
500 Acre Dairy Farm^a
1987 Projected

Item	1987 List Price	Purchase Price ^b	Annual Ownership Cost ^c
	\$	\$	\$
Tractors - 120 hp	39,200	29,939	4,533
80 hp	28,250	21,576	3,267
60 hp	24,700	18,864	2,856
Trucks - Pick up	11,200	8,554	1,858
Large farm (2 used)	16,000	12,220	2,168
Plow (5-18")	10,450	7,981	1,287
Disc (14')	7,450	5,690	917
Drag (16')	2,400	1,833	295
Seeder w/cultipacker	3,200	2,444	394
Corn planter (6R)	14,450	11,036	1,779
Sprayer (28')	4,000	3,055	492
Cultivator (6R)	3,150	2,406	388
Mower-conditioner (12')	14,500	12,557	2,549
Rake, side (9')	3,050	2,329	376
Baler w/kicker	12,450	9,509	1,533
Bale wagons (2)	3,300	2,520	382
Forage harvester	16,300	14,115	2,865
- Grass head (7.5')	3,800	3,291	668
- Corn head (3R)	7,600	6,581	1,336
- Snapper head (2R)	7,050	6,105	1,239
Dump wagon	8,200	7,101	1,523
Grain wagons (2)	4,300	3,284	497
Totals	245,000	192,990	33,202
Per acre	490	386	66

^aDairy farm with 100 acres of hay, 150 acres of hay crop silage, 150 acres of corn silage, and 100 acres of high moisture ear corn. Complement does not include power or equipment needed for livestock.

^bPurchase price is based on the 1987 list price times an index value to reflect an average price paid over the average ownership period for each machine.

^cOwnership cost is based on these assumptions:

Owned for:

6 years - Forage harvester and heads, dump wagon and mower.

10 years - All other equipment, tractors and trucks.

Trade-in values:

40 percent - Tractors and wagons.

30 percent - Planter, cultipacker, mower, forage harvester and heads.

10 percent - Trucks.

20 percent - All other equipment.

Straightline depreciation, 10 percent interest on average investment; two percent of purchase price for insurance and storage except actual truck insurance.

Appendix
Table 2.Crop Machinery Investment
1,200 Acre Crop Farm #1^a
1987 Projected

Item	1987 List Price	Purchase Price ^b	Annual Ownership Cost ^c
	\$	\$	\$
Tractors - 120 hp	39,200	29,939	4,533
80 hp FWA	34,050	26,005	3,937
80 hp	28,250	21,576	3,267
60 hp	24,700	18,864	2,856
40 hp	15,850	12,105	1,833
Combine - Power unit	71,250	62,945	14,244
Corn head (4R)	12,500	11,043	2,499
Grain head (13')	6,200	5,477	1,076
Bean head (4R)	12,000	10,601	2,083
Trucks - Pick up	11,200	8,554	1,858
Large farm (2 used)	16,000	12,220	2,168
Plow (5-18") (2)	20,900	15,962	2,573
Disc (14') (2)	14,900	11,380	1,834
Drag (16') (2)	4,800	3,666	591
Cultipacker (14')	2,750	2,100	328
Drill-seeder	7,650	5,843	942
Corn planter (8R)	19,150	14,626	2,286
Sprayer (28')	4,000	3,055	492
Cultivator (8R)	4,950	3,781	591
Mower-conditioner (9')	9,800	7,485	1,170
Rake, side (9')	3,050	2,329	353
Baler w/kicker	12,450	9,509	1,533
Bale wagons (3)	4,950	3,781	572
Grain wagons (2)	4,300	3,284	497
Totals	384,850	306,130	54,116
Per acre	321	255	45

^aFor a 1,200 acre cash crop farm with 100 acres of hay, 750 acres of corn grain, 200 acres of soybeans, and 150 acres of winter wheat.

^bPurchase price is based on the 1987 list price times an index value to reflect an average price paid over the average ownership period for each machine.

^cOwnership cost is based on these assumptions:

Owned for:

5 years - Combine and heads.

10 years - All other equipment, tractors and trucks.

Trade-in values:

50 percent - Grain and bean heads.

40 percent - Tractors, wagons and rake.

30 percent - Combine and corn head, planter, cultipacker, cultivator, and mower.

20 percent - All other equipment.

Straightline depreciation, 10 percent interest on average investment; two percent of purchase price for insurance and storage except actual truck insurance.

Appendix
Table 3.Crop Machinery Investment
1,200 Acre Crop Farm #2^a
1987 Projected

Item	1987 List Price	Purchase Price ^b	Annual Ownership Cost ^c
	\$	\$	\$
Tractors - 120 hp	39,200	29,939	4,533
- 80 hp FWA	34,050	26,005	3,937
60 hp	24,700	18,864	2,856
40 hp	15,850	12,105	1,833
Combine - Power unit	71,250	62,945	14,244
Corn head (4R)	12,500	11,043	2,499
Grain head (13')	6,200	5,477	1,076
Bean head (4R)	12,000	10,601	2,083
Trucks - Pick up	11,200	8,554	1,858
Large farm (2 used)	16,000	12,220	2,168
Plow (5-18")	10,450	7,981	1,287
Disc (14')	7,450	5,690	917
Drag (16')	2,400	1,833	295
Cultipacker (14')	2,750	2,100	328
Drill-seeder	7,650	5,843	942
Corn planter (8R no-till)	21,200	16,191	2,531
Sprayer (28')	4,000	3,055	492
Mower-conditioner (9')	9,800	7,485	1,170
Rake, side (9')	3,050	2,329	353
Baler w/kicker	12,450	9,509	1,533
Bale wagons (3)	4,900	3,781	572
Grain wagons (2)	4,300	3,284	497
Totals	333,400	266,834	48,004
Per acre	278	222	40

^aFor a 1,200 acre cash crop farm with 100 acres of hay, 750 acres of no-till corn grain, 200 acres of soybeans, and 150 acres of winter wheat.

^bPurchase price is based on the 1987 list price times an index value to reflect an average price paid over the average ownership period for each machine.

^cOwnership cost is based on purchase price and these assumptions:

Owned for:

5 years - Combine and heads.

10 years - All other equipment, tractors and trucks.

Trade-in values:

50 percent - Grain and bean heads.

40 percent - Tractors, wagons and rake.

30 percent - Combine and corn head, planter, cultipacker and mower.

20 percent - All other equipment.

Straightline depreciation, 10 percent interest on average investment; two percent of purchase price for insurance and storage except actual truck insurance.

Appendix
Table 4.Machinery Operating Factors
Field Crop Enterprise Budgets
1987

Machine		Width	Speed	Field Efficiency	Tractor Size
		feet	mph	%	hp
Plow	(5-18")	7.5	4.0	80	120, 80 FWA
Disc	(14')	14	4.5	80	120, 80 FWA
Drag	(16')	16	5.5	80	80 FWA, 80
Cultipacker	(14')	14	6.0	80	40
Drill-seeder		12.2	5.0	75	60
Corn planter	(6R)	15	5.0	65	60
Corn planter	(8R)	20	4.5	70	80
Corn planter	(8R-NT)	20	5.0	70	80 FWA
Sprayer	(28')	28	4.0	65	60
Cultivator	(6R)	15	4.5	80	80
Cultivator	(8R)	20	4.5	80	80
Mower-conditioner	(9')	9	5.0	70	60
Mower-conditioner	(12')	12	4.5	70	80
Rake, side		12	4.5	80	60, 40
Baler w/kicker		12	2.5	70	80